IGT Testing Systems

Research, development and production of testing equipment for the printing and allied industries

IGT Information leaflet W33
LOOSE AND WEAKLY BOUND PAPER PARTICLES (FLUFF)
IGT AIC2-5T2000, Global Standard Tester 2/3/3H

Version : July 2006

Introduction:

When paper has the tendency of releasing dust and/or particles of the coating or paper fibres, this will cause contamination of the printing form, resulting in frequent machine down-time. This shortcoming may be avoided if an instrument is available to test paper for this tendency. There is a number of fluff tests, but these do not meet the criteria stated below. These requirements are:

* The tester should not only react to loose dust but also to particles of coating and/or paper fibres released during the printing process.
* The test must provide a directly readable result.
* The tester should meet the requirements valid for all material tests such as simplicity, accuracy, reproducibility, low consumption of materials, etc.

With the present tester all these conditions are met.

Principle:

A steel disc, which is made sticky by means of a thin film of pick-test oil, is fitted in a holder and rolled over a number of sheets of paper. During this action the disc is accumulating the loose dust and paper particles. The steel disc is then inked up in one revolution by means of another inked rubber printing disc and on an IGT-printability tester a print is made on a strip of real art paper. On the print spots on which fluff has accumulated will show up as white spots (hickies).

Method of operation:

- It is recommended to execute the test in the standard atmosphere; to most standards it is 23.0 ± 1.0 °C (73.4 ± 1.8 °F) and 50 ± 2% rh.
- For the operation of the AIC2-5T2000, Global Standard Tester, High Speed Inking Unit 4 and ink pipette follow the instructions of the manuals, IGT information leaflet W100 and the displays accurately.
- Handle the samples carefully.

NOTE: To carry out this test the room must be free of dust.

Materials / testing conditions

1	IGT AIC2-5T2000 or IGT Global Standard Tester 2 or IGT Global Standard Tester 3 or IGT Global Standard Tester 3H	710.000.000 412.000.000 416.000.000 467.000.000
2	IGT High Speed Inking Unit 4	466.000.710
3	(Top roller with 4 segments for conventional inks)	(466.003.003)
4	IGT ink pipette (2x)	408.000.200
5	Fluff tester (disc holder, pedestal and weight)	428.007.002
6	Printing disc with rubber, uncoated, 65 Shore A, 35 mm	402.313
7	Printing disc, steel, 20 mm	402.306
8	Fluff test ink	404.003.005
9	Pick test oil, medium viscosity	404.004.020
10	Packing, rubber ,55 mm	404.001.006
11	Astralon strip, 55 mm	404.009.013
12	Contamination scale	428.001
13	Strips of art paper, IGT code Ka, 50 mm	404.009.025
14	Sector with clamps (for GST 2/3)	361.000.000
15	Sheets of paper to be tested, preferable A4 size, at least 60 sheets per sample Lint free rags	
16	Cleaning naphtha	
17		

Printing force	250 N
Printing speed	Constant, 0.2 m/s
Film thickness of pick test oil (volume)	0.32 µm (0.01 cm³)
Film thickness of fluff test ink (volume)	1.2 µm (0.05 cm³)

► The numbers 1 thru 14 are available at IGT Testing Systems.
► The numbers 5 thru 13 can be obtained as Fluff Test Set for IGT AIC2-5T2000 and GST 2/ 3/3H, article number 428.000.710.
►*This leaflet contains article numbers per January 1st, 2006*◄.

Preparation

1. Take a sample of at least 60 consecutive sheets for each paper grade to be tested. Avoid sliding the sheets one to another.
2. Mark the stacks of test material with a felt tip marker to distinguish top and/or bottom side, machine and/or cross direction and a code for the type of material.
3. Condition the papers, the ink, the pick test oil and equipment during > 6 hours in the standard atmosphere.
4. For AIC2-5T2000 only:
   - 4.1. Mount the rubber packing with the strip of Astralon on it on the sector. See W100.
   - 4.2. Adjust the printing force of the upper printing disc shaft to 250 N and pay attention for the right backlash. See W100.
   - 4.3. Adjust the printing speed to 0.2 m/s in the constant speed mode (□).
5. For GST only:
   - 5.1. Select the menu "Flufftest" in the display.
   - 5.2. If not present, mount the sector with clamps. See W100.
   - 5.3. Mount the rubber packing with the strip of Astralon on it on the sector. See W100.
6. Check the functioning of the tester following the instructions in the chapter "Execution".
7. Fill the one ink pipette with the fluff test ink and the other pipette with the pick test oil.
8. Adjust the High Speed Inking Unit with the following settings:
   Water bath: 23.0º C (73.4º F)
   Top roller: 4-segmented, rubber for conventional inks
   Mode: 3
   Starting time: 5 s
   Distribution time: 20 s
   Distribution speed: 0.5 m/s
   2nd Distribution time: 10 s
   2nd Distribution speed: 0.3 m/s
   Inking time printing discs: 20 s
9. Check the functioning of the High Speed Inking Unit.
10. Place the disc holder on the pedestal of the fluff tester.

Execution

1. Clean the printing discs and the rollers of the inking unit thoroughly and take care they are free of dust.
2. Apply 0.01 cm³of pick test oil to a segment and 0.05 cm³ of fluff test ink to another segment of the 4-segmented top roller of the inking unit and distribute the pick test oil and fluff ink. NOTE: It is not advised to add some ink or pick test oil after a test.
3. Place the printing discs on the printing disc shafts of the inking unit: the steel disc on the shaft of the segment with pick test oil and the rubber covered printing disc on the shaft of the segment with ink. Ink the discs during the preset time.

Fig. 1: disc holder on paper

4. Remove the steel printing disc with pick test oil from the inking unit and place it on the top shaft of disc holder.
5. Carefully remove the first sheet from the stack of test material.

►

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6. Remove the disc holder with the steel disc from the pedestal. Hold the device in such a way that the steel disc cannot slide off or swing.
7. Place the disc holder on the stack of test paper in such a way that the starting point of the disc (the part of the disc corresponding with the red point in the disc) rests on the paper.
8. Make one revolution of the steel disc on the top sheet, not too close to the border. The printing force during this action is obtained from the weight of the disc holder and the disc combined.
   NOTE: In case the test is carried out in order to determine the presence of cutting dust, the steel disc must be rolled along the border of the paper. In addition the sheets of the sample are moved along each other before the start of the test.
9. Remove the disc holder with disc from the paper and carefully remove the tested sheet from the stack. Hold the device in such a way that the steel disc cannot slide off or swing.
10. Repeat points 7 thru 9 for another 24 sheets.
11. Place the disc holder in the pedestal and swing the steel disc up.
12. Remove the inked rubber covered disc from the inking unit and place it on the bottom shaft of the disc holder.
13. Slide the eyelet at the cord attached to the weight on the pin of the rubber disc and wind the cord anti clockwise on the handle (not over the pin!).
14. Lower the steel disc with the starting point (red dot) on the rubber covered disc.
15. Swing the lever a quarter turn back and forth, so that the two discs roll against each other over one revolution and the steel disc is inked.

Fig. 2: disc holder on pedestal

16. Attach a strip of Ka-paper on the sector of the printability tester.
17. Remove the steel disc from the disc holder and place it on the (top) shaft of the printability tester.
18. Turn the disc so that the red dot is pointening to the contact point between the paper and the sector.
19. Make a print. See W100.
20. Take off the printed strip from the sector.
21. Check the test result as pointed out in the chapter "Assessment".
22. Remove the printing discs from the tester and from the disc holder and clean them with the rags and naphtha.
23. Clean the rollers of the inking unit or use the next segments for the following test.
24. Repeat the points 1 thru 23 for the next test. It is recommended to perform the test at least two times
25. After finishing the tests clean and store all parts as described in the manuals. Grease the steel disc to avoid oxidation.
26. Make an accurate record of the conditions and the results of the test.

Assessment

1. Examine the printed strip visually and compare it to the standard IGT contamination scale, in which 1 = very good and 6 = very bad.
2. Repeat point 1 for each test strip.
3. Calculate the average per type of paper. Sometimes it may be useful to note the highest and lowest values as well.

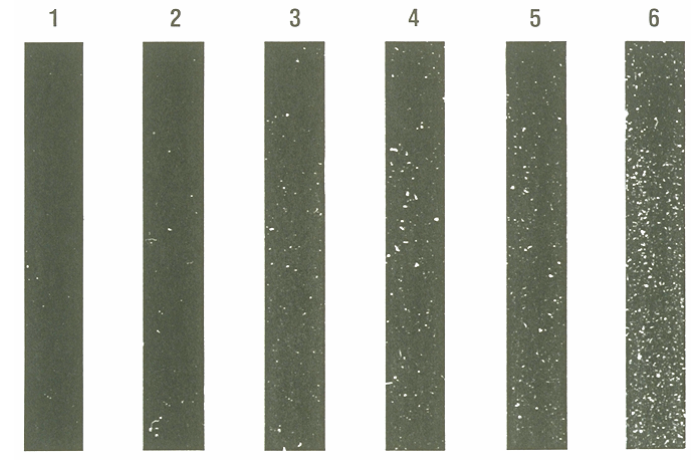

Fig. 3: contamination scale

Notes:

1. The test results of the AIC2-5T2000, AIC2-5 and Global Standard Testers 2, 3 and 3Hcompare well with one another on the condition that the tests have been carried out under the same testing conditions.

2. Due to various circumstances, such as dusty surroundings, damaged disc, dirt in the inking unit, etc., white spots may appear in a print, not originating from the paper under investigation. It is therefore recommended to make a blank test before testing the first paper sample and after testing the last paper sample. When many papers have to be tested it is recommended to make a blank test between the paper samples. Of course great care has to be taken to avoid the presence of dust in the room during the test.

3. The maximum storage life of the fluff test ink and pick test oil in the original, closed packing is 3 years; in an opened packing 1 year.

► *In comparison to older IGT leaflets, this leaflet is valid for the AIC2-5T2000 and Global Standard Testers as mentioned*

This information leaflet has been compiled with the utmost care. However, may you find any inadequacies or if there are any comments, we kindly request you to send these to IGT Testing Systems, Sales Department.

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